

Application No.: 09/985,693

Docket No.: 21806-00143-US

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all previous versions and listings of claims in this application:

Claims 1-25 (Canceled).

26. (Previously presented) A method of fabricating a semiconductor structure, the method comprising:

providing a first substrate and a second substrate;

providing a plurality of controlled collapse chip connection ("C4") solder bump contacts on one of the first substrate and the second substrate;

providing first solder bumps on one of the first substrate and the second substrate,

wherein the plurality of C4 solder bump contacts have a different solder composition than the first solder bumps;

mounting the first substrate on the second substrate;

reflowing the first solder bumps at a first temperature to initially align the plurality of C4 contacts by a surface tension of the reflowed first solder bumps; and

finely aligning the plurality of C4 contacts by reflowing the plurality of C4 contacts at a second temperature higher than the first temperature.

27. (Canceled).

28. (Original) The method according to claim 26, wherein at least one of the first substrate and the second substrate is an integrated circuit chip.

29. (Canceled).

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30. (Previously presented) The method according to claim 26, wherein the C4 solder bump contacts ball up to make contact between the first substrate and the second substrate.

31. (Previously presented) The method according to claim 26, wherein the C4 solder bump contacts comprise a material having a higher melting point than the first solder bumps, and reflowing the C4 solder bump contacts requires heating the C4 solder bump contacts to a higher temperature than reflowing the first solder bumps.

32. (Original) The method according to claim 26, wherein the C4 solder bump contacts are smaller than the first solder bumps.

33. (Canceled).

34. (Canceled).

35. (Previously presented) The method according to claim 26, wherein reflowing the first solder bumps draws the first substrate toward the second substrate to cause the plurality of C4 contacts to make contact with the first substrate and the second substrate.

36. (Previously presented) The method according to claim 26, wherein the first solder bumps contact the first substrate and the second substrate prior to the plurality of C4 contacts making contact between the first substrate and the second substrate.

37. (Previously presented) The method according to claim 26, wherein the plurality of C4 contacts are provided by thin film processing.

38. (Original) The method according to claim 37, wherein the thin film processing comprises lift off stencil or subtractive etch.

39. (Previously presented) The method according to claim 26, wherein the plurality of C4 contacts each are provided with a diameter of less than about 50 μm .

40. (Previously presented) The method according to claim 26, wherein the plurality of C4 contacts each are provided with a diameter of about 10 μm .

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41. (Currently amended) ~~The method according to claim 26,~~ A method of fabricating a semiconductor structure, the method comprising:

providing a first substrate and a second substrate;

providing a plurality of controlled collapse chip connection ("C4") solder bump contacts on one of the first substrate and the second substrate;

providing first solder bumps on one of the first substrate and the second substrate,

wherein the plurality of C4 solder bump contacts have a different solder composition than the first solder bumps;

mounting the first substrate on the second substrate;

reflowing the first solder bumps at a first temperature to initially align the plurality of C4 contacts by a surface tension of the reflowed first solder bumps; and

finely aligning the plurality of C4 contacts by reflowing the plurality of C4 contacts at a second temperature higher than the first temperature.

wherein the plurality of C4 contacts each are provided with a diameter of less than about 10 μm .

42. (Previously presented) The method according to claim 26, wherein the plurality of C4 contacts are provided with a pitch of less than about 100 μm .

43. (Currently amended) ~~The method according to claim 26,~~ A method of fabricating a semiconductor structure, the method comprising:

providing a first substrate and a second substrate;

providing a plurality of controlled collapse chip connection ("C4") solder bump contacts on one of the first substrate and the second substrate;

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providing first solder bumps on one of the first substrate and the second substrate,

wherein the plurality of C4 solder bump contacts have a different solder composition than the first solder bumps;

mounting the first substrate on the second substrate;

reflowing the first solder bumps at a first temperature to initially align the plurality of C4 contacts by a surface tension of the reflowed first solder bumps; and

finely aligning the plurality of C4 contacts by reflowing the plurality of C4 contacts at a second temperature higher than the first temperature,

wherein the plurality of C4 contacts are provided with a pitch of about 30 μm .

44. (Previously presented) The method according to claim 26, wherein the plurality of C4 contacts are provided with a diameter about 20 % of the diameter of the first solder bumps.

45. (Previously presented) The method according to claim 26, wherein the plurality of C4 contacts are provided with a smaller diameter than the first solder bumps.

Claims 46-49: (Canceled).

50. (Previously presented) The method according to claim 26, wherein the plurality of C4 contacts and the first solder bumps are provided such that an upper surface of the plurality of C4 contacts and an upper surface of the first solder bumps are co-planar.

51. (Canceled).

52. (Previously presented) The method according to claim 26, further comprising:

providing a ledge on at least one of the first substrate and the second substrate, wherein the first solder bumps are arranged in contact with the ledge, such that an upper surface of the plurality of C4 contacts and an upper surface of the first solder bumps are co-planar.

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53. (Previously presented) The method according to claim 26, wherein the plurality of C4 contacts are compressed as the first solder bumps are reflowed.

54. (Previously presented) The method of claim 26, further comprising arranging the first solder bumps around a periphery of an area containing the plurality of C4 contacts.

55. (Canceled).

56. (Previously presented) The method of claim 26, further comprising ensuring that the first solder bumps are free of an electrical connection with any of the plurality of C4 contacts.

57. (Previously presented) The method of claim 26, wherein the step of providing the plurality of C4 contacts on one of the first substrate and the second substrate comprises providing a plurality of second solder bumps each having a volume smaller than a volume of each of the plurality of first solder bumps.